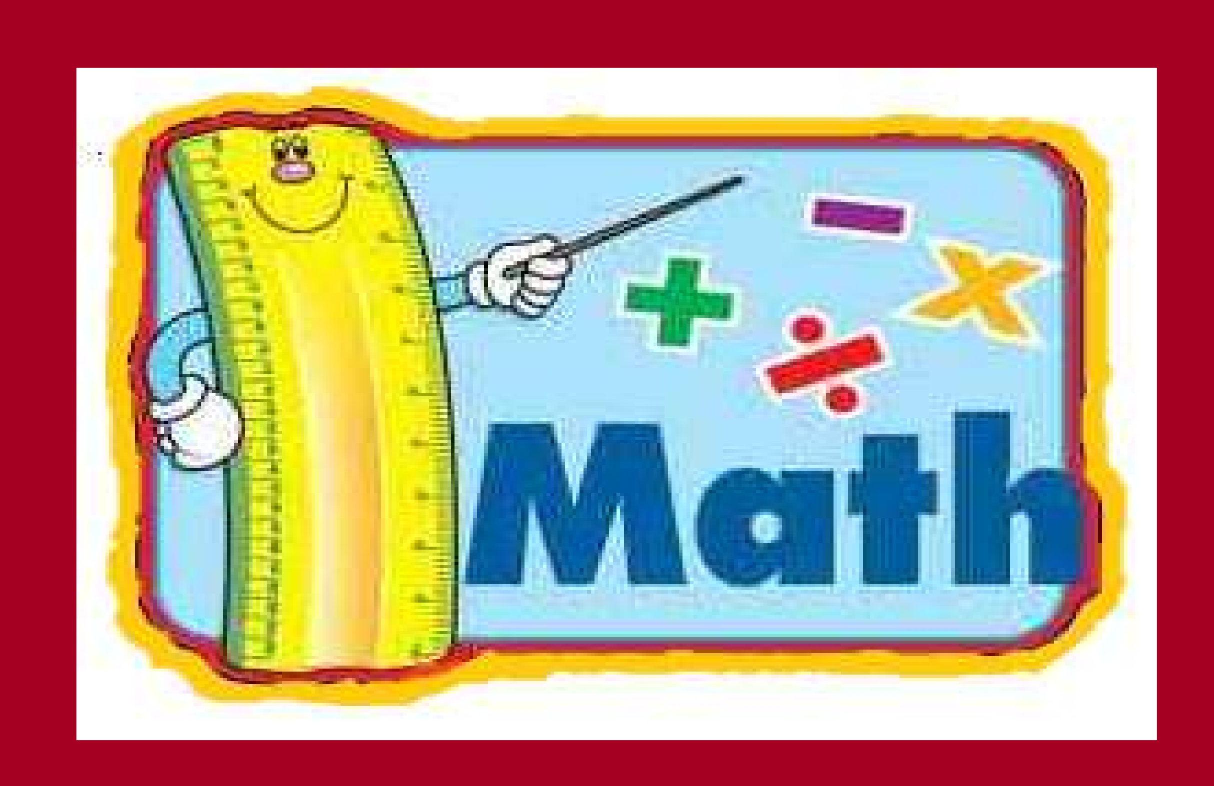
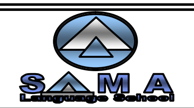


Geometry

2nd prep

2012-2013

1st - Term

Date :…………..… **Sheet (1)** 

Medians Of Triangle

1) Complete the following :

a) In Δ ABC , if D is the midpoint of BC , then AD is called ………

b) The point of concurrence of the medians of the triangle divides each in the ratio ………. from the vertex .

c) The point of concurrence of the medians of the triangle divides each in the ratio ………. from its base.

d) The median drawn from the vertex of the right angle in the right-angled triangle = ………….

e) The length of the side opposite the angle whose measure is 30 ° in the right-angle triangle = ……….

f) The length of the hypotenuse in thirty and sixty triangle equal ………. The length of the side opposite the angle whose measure is 30 ° .

2) Choose the correct answer from those ones:

1) A parallelogram, its perimeter is 34 cm. and the length of one of its sides is 7cm., then the length of the adjacent side of it equals…….cm.

a) 10 b) 7 c) 9 d) 11

2) ABCD is a parallelogram in which m ($\angle$B) + m ($\angle$D) = 240^o, then m ($\angle$C) = ………

a) 120^o b) 80^o c) 60^o d) 50^o

3) In ΔABC, if $\overline{AD}$ is a median of it, M is the point of intersection of its medians, DM = 4cm., then AD = ...

a) 8cm b) 12cm c) 16cm d) 4cm

4) ABC is a triangle in which m ($\angle$B) = 90^o, m ($\angle$A) = 60^o, then AC = ...

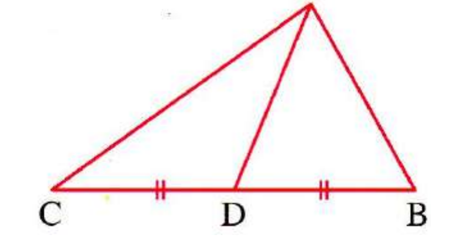
a) $\frac{1}{2}$ AB b) AB c) 2AB d) 2BC

5) In the opposite figure:

If $\overline{AD}$ is a median of ΔABC, then m ($\angle$BAC) = 90^o if............

a) AD = $\frac{1}{2}$ AC b) AD = $\frac{1}{2}$ AB

c) BC = $\frac{1}{2}$ AD d) AD = $\frac{1}{2}$ BC

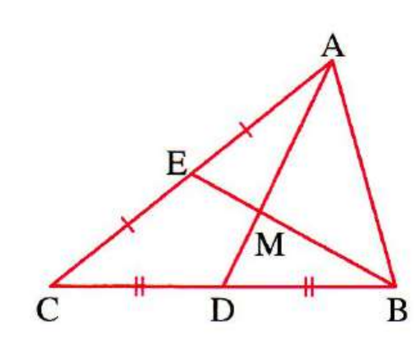


6) In the opposite figure:

If $\overline{AD}$ and $\overline{BE}$ are two medians of ΔABC, AM = 6cm., then MD = ...

a) 9cm b) 2cm

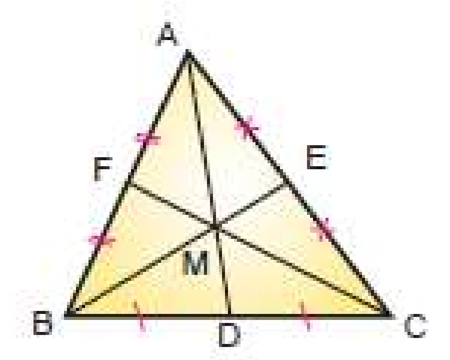
c) 3cm d) $1\frac{1}{2}$ cm



3) In the opposite figure :

If MD = 4 cm and BC = 10 cm , then

AM = ... cm, DC = ... cm

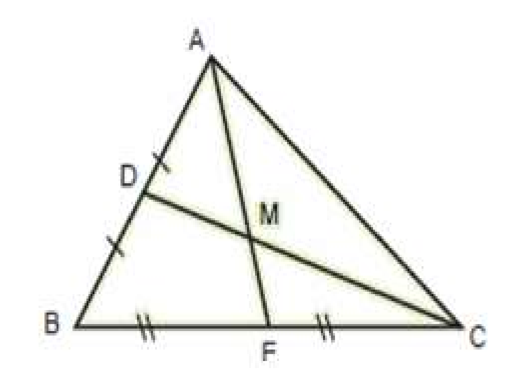


4) In the opposite figure :

If MF = 5 cm and MC = 10 cm , then

AM = ... cm,   MD = ... cm

MF = ... AF and MC = ... DC

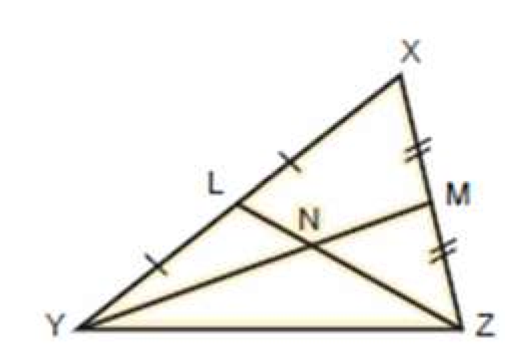


5) In the opposite figure :

If LZ = 30 cm, YM = 36 cm, XY = 40 cm,

then MN = ..., NL = ..., NZ = ...

and Perimeter of Δ NLY = ...



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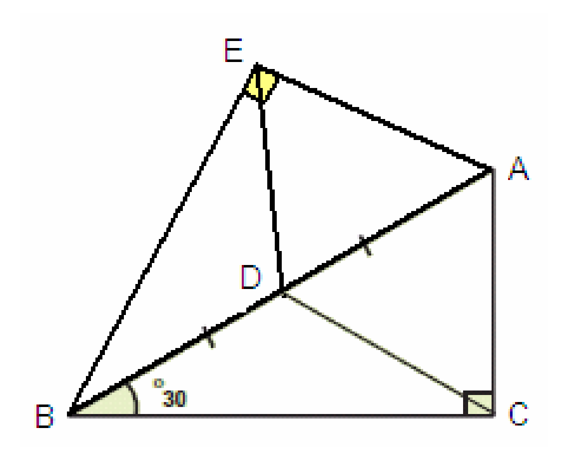
6) In the opposite figure :

m (∠AEB) = m (∠ACB) = 90 °,

m (∠ABC) = 30°   and

D is the midpoint of AB

Prove that : AC = ED



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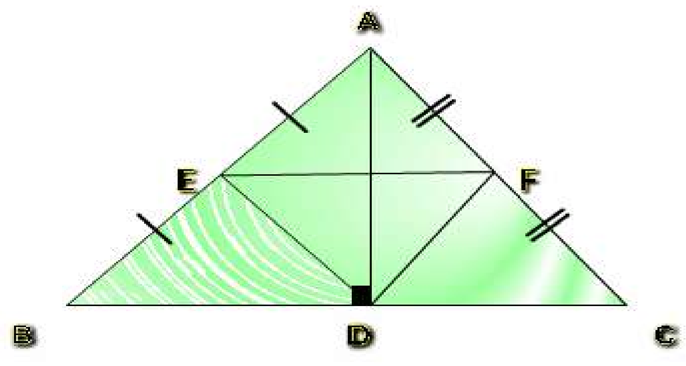
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7) In the opposite figure :

If AB = 10 cm , AC = 16 cm,

BC = 20 cm and AD ⊥ BC , then

the Perimeter Δ DEF = ... cm



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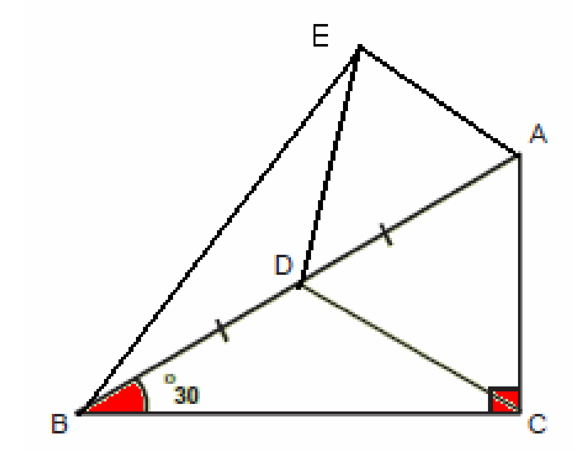
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8) In the opposite figure :

m (∠C) = 90 °, m (∠ABC) = 30° ,

AC = ED and D is the midpoint of AB

Prove that : m (∠AEB) = 90 °,



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Date:............ **Sheet (2)**



The Isosceles Triangle (theorem 1)

1) Complete the following :

a) Both of the base angles in the isosceles triangle are ....

b)The vertex angle in the isosceles triangle can be either ....,

.... or ....

c) The base angles of the isosceles triangle are ....

d) The measure of each angle in the equilateral triangle = ...°

e) In the isosceles triangle, If the measure of the vertex angle = 40°,

then the measure of one of the two base angles of =...........°

2) Choose the correct answer from those given:

1) In Δ XYZ, if XY = YZ = XZ, then m ($\angle$X) = ...

a) 30^o b) 60^o c) 90^o d) 180^o

2) The measure of the exterior angle of the equilateral triangle = ...

a) 60^o b) 90^o c) 120^o d) 180^o

3) If Δ ABC is right-angled at A and AB = AC, then m ($\angle$B) = ...

a) 30^o b) 45^o c) 60^o d) 90^o

4) If the measure of one of the two base angles in the isosceles triangle $= 30^{o}$, then the triangle is ....

a) obtuse-angled   b) acute-angled

c) right-angled   d) equilateral triangle

5) In ΔXYZ, if XY = XZ, then the exterior angle at the vertex Z is ....

a) acute   b) obtuse   c) right   d) reflex

3) In the opposite figure :

AB = AD = CD and m ($\angle$ADC) = 130 °,

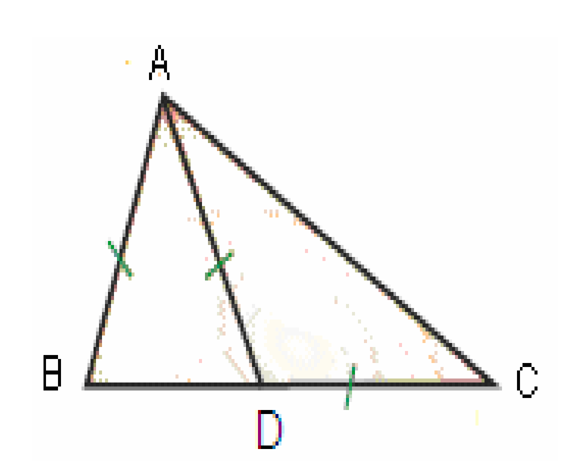
Complete the following :

a) m ($\angle$DCA) = ... °

b) m ($\angle$ADB) = ... °

c) m ($\angle$DAB) = ... °

d) m ($\angle$BAC) = ... °

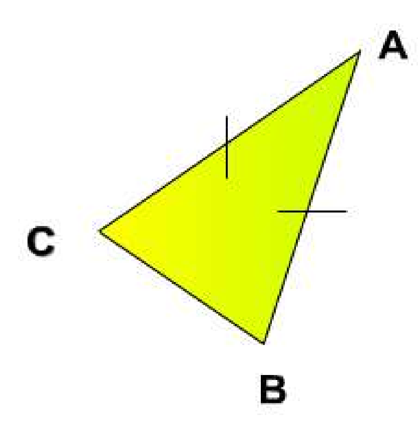


4) In the opposite figure :

AB = AC , m ($\angle$B) = (2x + 13)° and

m ($\angle$C) = (3x – 17)° , then

find the value of x.



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5) In the opposite figure :

BC = AC , AD // BC and m (∠B) = 75 ° ,

Find by proof m(∠DAC)

………

………

………

………

6) In the opposite figure :

ABC is equilateral triangle and

BDC is isosceles right triangle

Find by proof m(∠ABD)

………

………

………

………

7) In the opposite figure :

In Δ ABC, AB = AC , AD $\perp$ BC and

m($\angle$BAD) 25 °

Find by proof m($\angle$BAC)

A
25°
C D B

……

……

……

……

……

8) In the opposite figure :

ABC is equilateral triangle , AB = 4x - 6

and AC = 2x +3, then

find the value of x.

A
C B

……

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9) In the opposite figure :

ADC is equilateral triangle and

AD = BD , then

Prove that : $BA \perp AC$

……

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10) In the opposite figure :

AB = AC and BD = CD

Prove that : $m(\angle ABD) = (\angle ACD)$

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11) In the opposite figure :

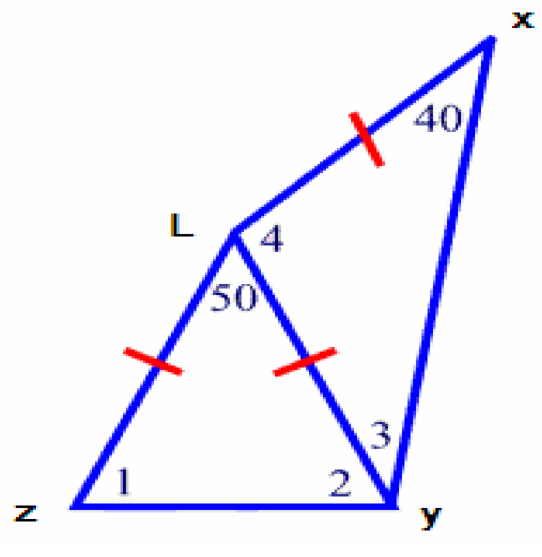
Find the measures of angles

1 , 2 , 3 and 4

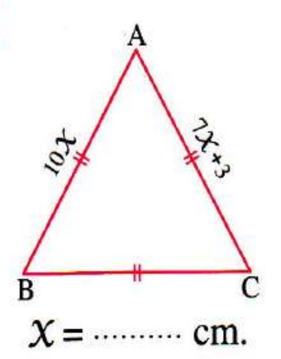
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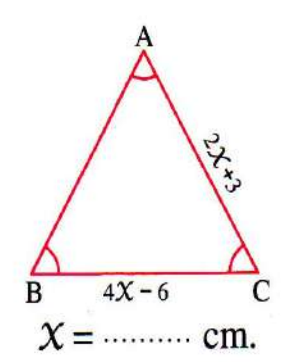
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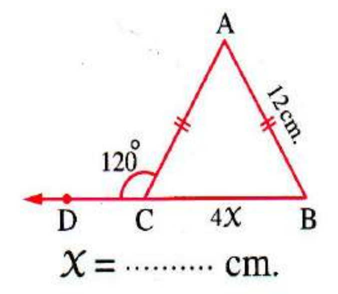
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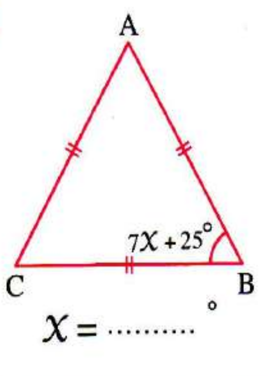


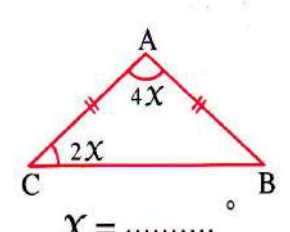
12) find the value of x in the following:

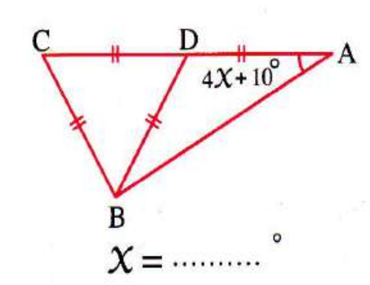


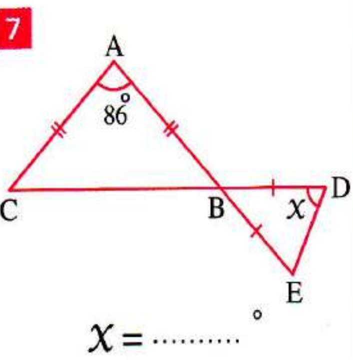


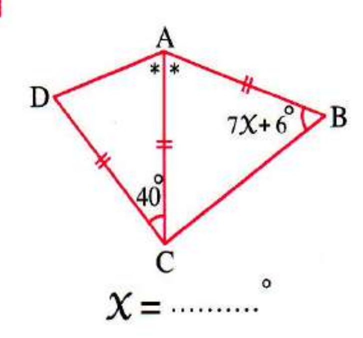


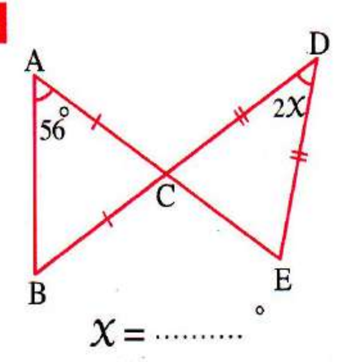


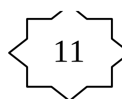




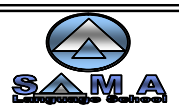






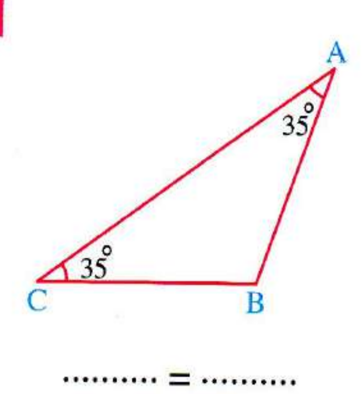


Date:.................. **Sheet (3)**

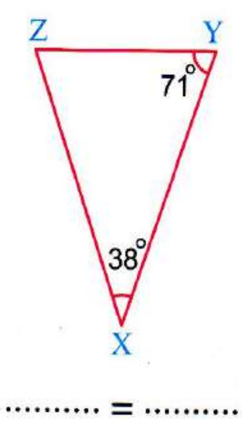


The Isosceles Triangle (theorem 2)

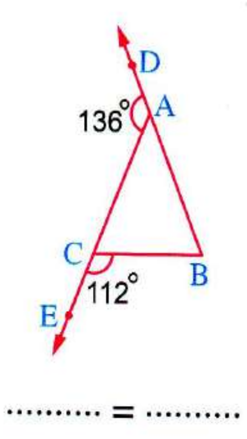
1) In each of the following figures, write the equal sides in length:



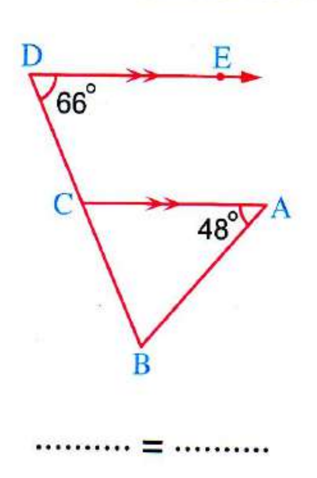
.... = ...



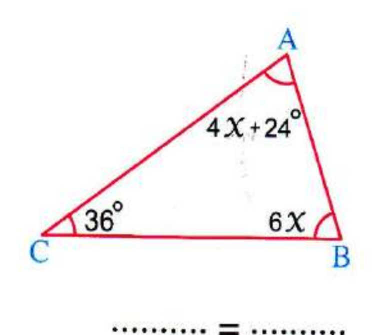
.... = ...



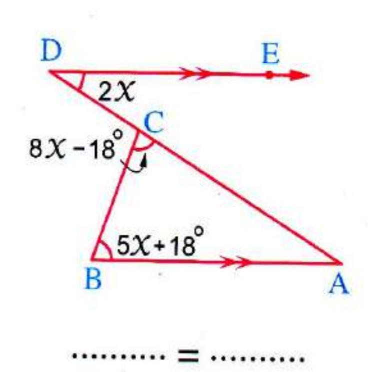
.... = ...



.... = ...



.... = ...



.... = ...

2) Complete the following :

a) If two angles of a triangle are congruent, then the two sides opposite to these two angles are .... and the triangle is ....

b) If the angles of a triangle are congruent, then the triangle is ....

c) In Δ ABC, if m(∠A) = 50 ° and m(∠B) = 80 °, then the triangle is ....

d) If the measure of one angle in the right-angle triangle =45 °, then the triangle is ……………………

e) If the measure of one angle of an isosceles triangle = 60°, then the triangle is ……………………

f) In Δ ABC, if m(∠A) = 60 ° , AB = AC and the perimeter of the triangle = 18 , the BC = ………… cm.

g) The measure of any exterior angle of the equilateral triangle = ……….

h) In Δ ABC, if AB = and m (∠B) = 55 ^{o}, then m (∠A) = …………. ^{o}

i) The length of the median drawn from the vertex of the right angle in the right-angled triangle equals…………….

3) Choose the correct answer from those ones:

1) In Δ ABC, $\overline{AD}$ is a median of it. M is the point of intersection of its medians, then AM = ………….AD

a) $\frac{1}{2}$ b) 2 c) $\frac{2}{3}$ d) $\frac{3}{2}$

2) The two base angles of the isosceles triangle are…………….

a) supplementary b) congruent

c) complementary d) not equal in measure

3) In the opposite figure:

AB = AD, Δ BCE is an equilateral triangle,

m (∠A) = 50^{o}, then m (∠ABC) = …………

a) 60º b) 110º c) 120º d) 125º

4) In the isosceles triangle, if the measure of one of the two base angles = 50^o, then the measure of the vertex angle = ...

a) 50^o b) 100^o c) 80^o d) 130^o

5) In ΔABC, if m ($\angle$A) = 30^o, m ($\angle$B) = 90^o, then AC = ...

a) $\frac{1}{2}$BC b) 2BC c) 2AB d) BC

6) In the opposite figure:

If $\overline{AE}$ and $\overline{BD}$ are to medians intersecting

at M, m ($\angle$B) = 90^o, AC = 12cm., then BM = ...

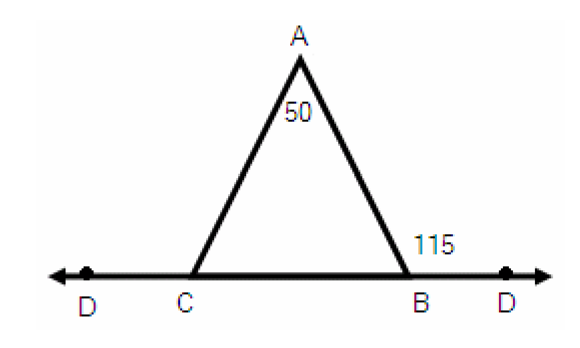
a) 4cm b) 2cm c) 6cm d) 8cm

7) If ΔABC is a right-angled triangle at A, AB = AC, then m ($\angle$B) = ...

a) 30^o b) 45^o c) 60^o d) 90^o

4) In the opposite figure :

Prove that : ABC is an isosceles triangle



....

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5) In the opposite figure :

Prove that :

ABC is an isosceles triangle

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6) In the opposite figure :

Prove that :

ABC is an isosceles triangle

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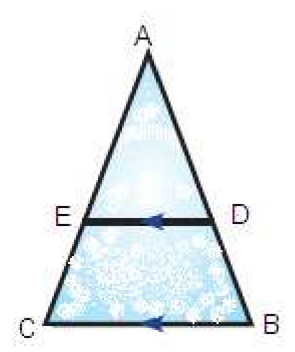
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7) In the opposite figure :



In Δ ABC, if AB = AC and DE // BC

Prove that :

a) ADE is an isosceles triangle

b) DB = EC

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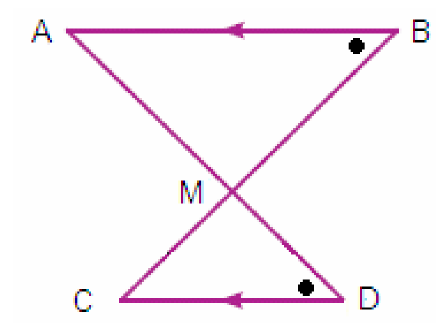
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8) In the opposite figure :



$m(\angle B) = m(\angle D)$ and $\overline{AB} \parallel \overline{CD}$

Prove that : BC = AD

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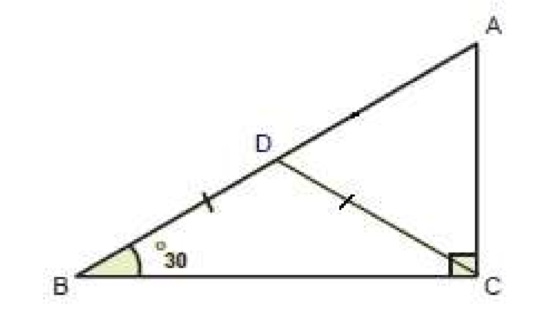
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9) In the opposite figure :



ABC is a right-angled triangle at C,

m (∠ B) = 30°, D ∈ $\overline{AC}$ where DC = DB

Prove that : Δ ADC is an equilateral triangle

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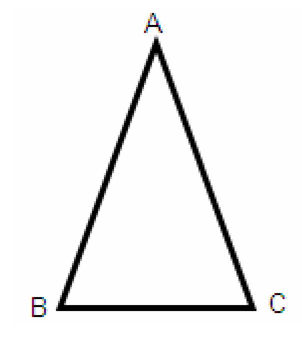
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10) In the opposite figure :



In Δ ABC, if m (∠ A) = 2y ° , m (∠ B) = (3y + 5) °

And m (∠ C) = 50 °, then

a) Find the value of y

b) Prove that : ABC is an isosceles triangle

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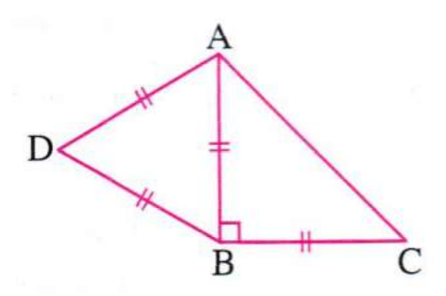
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11) In the opposite figure:



$m(\angle ABC) = 90^o$, $AB = BC = BD = DA$

Find: $m(\angle CAD)$

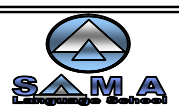
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Corollaries of isosceles triangle

1) Complete the following :

a) The median of an isosceles triangle from the vertex angle .... it and is .... to the base.

b) The bisector of the vertex angle of an isosceles triangle bisects the .... and is .... to it.

c) The straight line drawn passing through the vertex angle of an isosceles triangle .... to the base .... each of the base and the vertex angle.

d) The axis of symmetry of the isosceles triangle is the straight line drawn from the .... angle perpendicular to its ....

e) The straight line perpendicular to a line segment at its middle is called the axis of ....

f) Any point at the axis of symmetry of any line segment is at .... distances from its end points.

g) The number of symmetrical axes of the equilateral triangle is ....

h) The number of axes of symmetry of the isosceles triangle = ...

i) The triangle whose sides lengths are 4 cm, (X + 1) and 7cm becomes an isosceles triangle when X = ... cm.

j) The number of axes of symmetry of the scalene triangle = ...

k) The number of axes of symmetry of the square = ...

l) The number of axes of symmetry of the rectangle = ...

m) The number of axes of symmetry of the rhombus = ...

n) The number of axes of symmetry of the parallelogram = ...

o) The number of axes of symmetry of the isosceles trapezium = ...

p) The number of axes of symmetry of the circle = ...

q) The number of axes of symmetry of the semi-circle = ...

r) The triangle whose angles are congruent has..........axes of symmetry.

s) In ΔABC, if m ($\angle$A) = m ($\angle$B) = 60^o, then the number of axes of symmetry of ΔABC is...........

t) In ΔABC, if m ($\angle$A) = m ($\angle$B) $\neq 60^o$, then the number of axes of symmetry of ΔABC is ....

u) If the measure of an angle in the isosceles triangle is 100^o, then the measure of an angle of the other two = ...

v) In ΔABC, if AB = AC , m ($\angle$A) = 60^o, then the number of axes of symmetry of ΔBC is ....

w) If the measure of one angle in the right-angled triangle is 45^o, then the number of axes of symmetry of the triangle is …………

x) If the length of each side in the triangle = $\frac{1}{3}$ the perimeter of the triangle, then the number of axes of symmetry of the triangle is ……..

y) If ABCD is a rhombus, then the axis of symmetry of $\overline{AC}$ is ………….

2) Choose the correct answer from those given:

1) The axis of symmetry of the line segment is the straight line which is

a) parallel to the line segment b) perpendicular to it only

c) the bisector to it d) perpendicular to it from its midpoint

2) If ΔABC has one axis of symmetry and if m ($\angle$ABC) = 120^o, then m ($\angle$A) = ………….^{o}.

a) 60 b) 120 c) 30 d) 40

3) ABC is a triangle in which m ($\angle$A) = 70^o and m ($\angle$B) = 40^o, then the number of axes of symmetry of it = ……………..

a) 1 b) 2 c) 3 d) zero

4) If ABCD is a quadrilateral in which AB = AD and BC = DC, then $\overleftrightarrow{AC}$ is …………..$\overline{BD}$

a) parallel to b) equal

c) the axis of symmetry of d) congruent to

5) The triangle whose sides lengths are 2cm., (X +3)cm. and 5cm. becomes an isosceles triangle when X = ………….cm.

a) 1 b) 2 c) 3 d) 4

6) If $\overleftrightarrow{XY}$ is the axis of symmetry of $\overline{AB}$, then ....

a) AX = BY b) AX = BX c) BY = XY d) AY = BX

7) In the square ABCD , $\overleftrightarrow{BD}$ is the axis of symmetry of..........

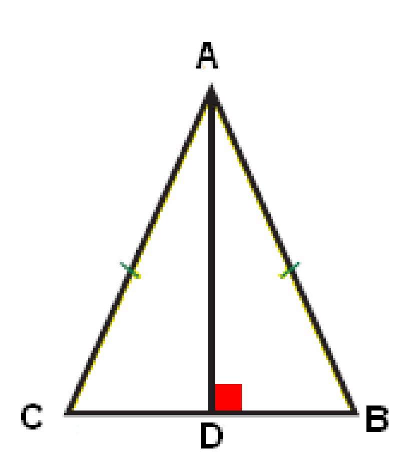
a) $\overline{AB}$ b) $\overline{AC}$ c) $\overline{AD}$ d) $\overline{CD}$

3) In the opposite figure :

In Δ ABC, if AB = AC , AD ⊥ BC ,

BC = 4 cm and m (∠ DAC) = 35 ° , then

Complete the following :



a) m (∠ BAD) = ... °

b) m (∠ BAC) = ... °

c) m (∠ B) = ... °

d) BD = ... cm

e) The axis of symmetry of Δ ABC is ....

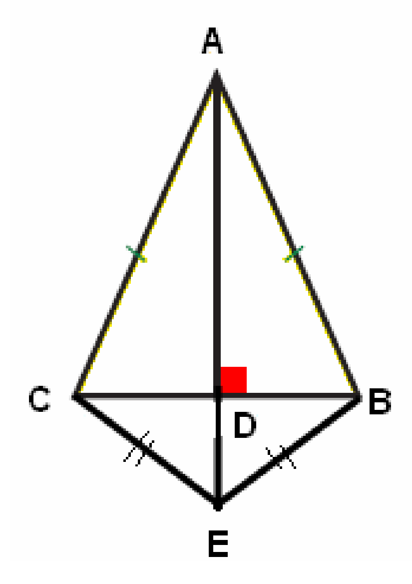
4) In the opposite figure :

ABEC is a quadrilateral, if AB = AC , EB = EC, $\overline{AE}$ ⊥ $\overline{BC}$, BD = 4 cm,

m (∠ BAD) = 30 ° and

m (∠ BEC) = 110 ° , then

Complete the following :



a) m (∠ CAD) = ... °

b) m (∠ BED) = ... °

c) m (∠ ACD) = ... °

d) CD = ………… cm

e) AC = ………… cm

f) AD = ………… cm

g) The number of axis of symmetry of Δ ABC = ……………

h) The number of axis of symmetry of Δ BEC = ……………

5) In the opposite figure :

AB = AC = 10 cm, and EB = EC,

Prove that : BD = DC ,

and if BC = 12 cm, then find the length of CD and AD

A
E
C
D
B

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Inequality

1) In the opposite figure:

Find: m (∠ ACB) , m (∠ ACD)

and m (∠ ADE) then

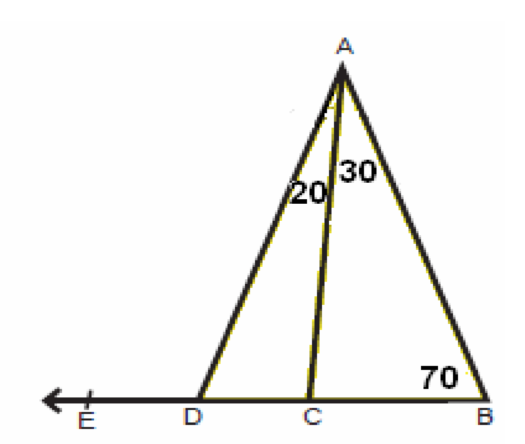
Complete by using > , < or = :

a) m (∠ ADE)......... m (∠CAD)

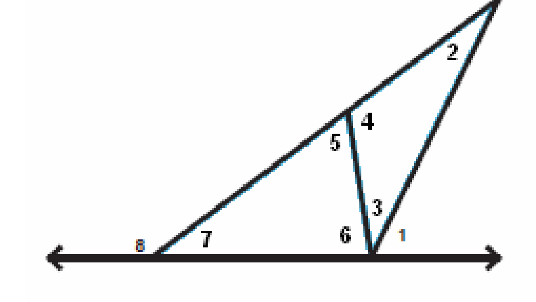
b) m (∠ ADC) .... m (∠ ACB)

c) m (∠ ACD) .... m (∠ ABC)

d) m (∠ ACD) .... m (∠ ADE)



2) In the opposite figure, find:



a) All angles of measures less than m (∠ 3)

b) All angles of measures greater than m (∠ 4)

c) All angles of measures less than m (∠ 5)

....

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Comparing the measures of the angles of a triangle

1) Arrange the measures of the angles of $\triangle$ABC in each of the following cases ascendingly:

a) If AB = 12cm., BC = 15cm. and AC = 10cm.

b) If AB = 5.7cm., BC = 8.5cm. and AC = 6cm.

2) In each of the following figures, complete using (> , <):

1	2	3
A, B, C; 4cm., 5.4cm., 6.2cm.	X, Y, Z; 5.6cm., 4.2cm., 2cm.	A, B, C, D; 6cm., 5cm., 7cm., 8cm.
m (∠A) …….m (∠B)	m (∠Z) …..m (∠Y)	m (∠BAC) …..m (∠BCA)
m (∠A) …….m (∠C)	m (∠X) …..m (∠Y)	m (∠DAC) …..m (∠DCA)
m (∠B) …….m (∠C)	m (∠Z) …..m (∠X)	m (∠BAD) …..m (∠BCD)

3) Complete the following :

a) In a triangle, if two sides have unequal lengths, then the longer side is opposite to the angle of the ……………… measure.

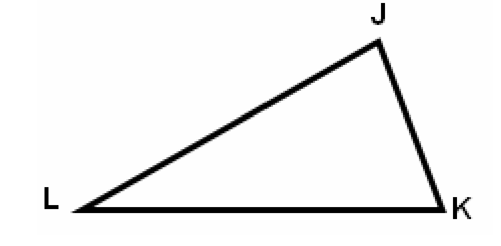
b) In a triangle, the longest side in length is opposite to the ……………… angle in measure while the shortest side in length is opposite to the ……………… angle in measure.

d) If the measure of two angles of a triangle are unequal, then the greater in measure is opposite to……….

e) In Δ ABC: If AB = AC and m ($\angle$A) = 2m ($\angle$B), then m ($\angle$C) = ……..

f) ABC is a triangle in which m ($\angle$A) = 50^o, m ($\angle$B) = 60^o, then the length of ……….< the length of……….

4) In the opposite figure:



In Δ JKL, IF LK > JL > JK

Prove that :

m ($\angle$ J) > m ($\angle$ K) > m ($\angle$ L)

……

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5) In the opposite figure:

Prove that :

m ($\angle$ ABC) > m ($\angle$ ADC)

....

....

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....

6) In the opposite figure:

XYZ is a triangle where $\overline{YL}$ bisects $\angle$XYZ,

and $\overline{ZL}$ bisects $\angle$ XZY, If: ZL > YL

Prove that: m ($\angle$ XYZ) > m ($\angle$XZY)

....

....

....

....

7) In the opposite figure:

ABC is an equilateral triangle whose side

length = 7 cm,

AD = 5 cm and CE = 4 cm

Prove that: m (∠ AED) > 60 °

....

....

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8) In the opposite figure:

m (∠ A C B) > m (∠ A B C) and

DB = DC

Prove that :

m (∠ A C D) > m (∠ A B D)

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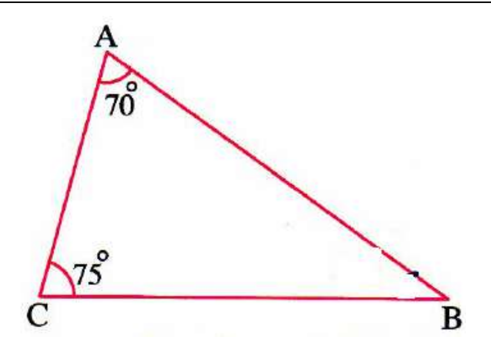
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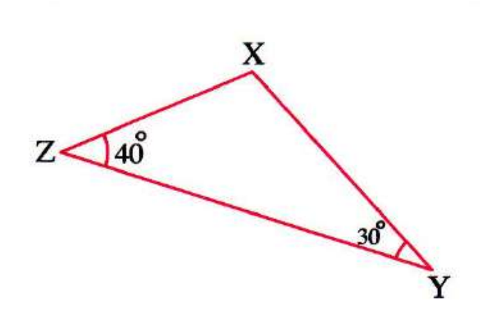
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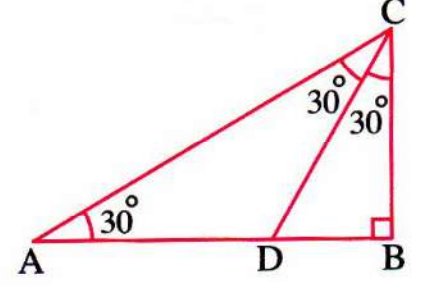


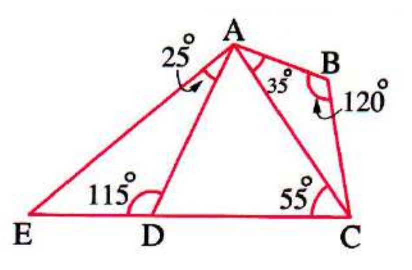
Comparing the lengths of sides of a triangle

1) In the following figures, complete using > or < or =:

<table>
<tr>
<td>


AB …………. AC
AB …………. BC
AC …………. BC
</td>
<td>


XY …………. XZ
YZ …………. XY
YZ …………. XZ
</td>
</tr>
<tr>
<td>


AC …………. BC
BC …………. DB
AC …………. BD
CA …………. DC
</td>
<td>


BC …………. AB
CD …………. CA
AD …………. AE
CD …………. AD
</td>
</tr>
</table>

2) Complete the following :

a) In a triangle, If the measures of the angles in a triangle are unequal, then the lengths of its sides which are opposite to the angles are ……

b) In a triangle, if two angles are unequal in measure, then the greater angle in measure is opposite to a side …………… in length than that opposite to the other angle.

c) In the right-angled triangle, the …………………… is the longest side.

d) In the obtuse angled triangle, the side opposite to the obtuse angle is the ……………… side in the triangle .

e) The length of the perpendicular line segment drawn from a point outside a straight line to this line is …………… than any line segment drawn from this point to the given straight line.

f) The distance between any point and a given straight line is the length of the ………………… line segment drawn from the point to the given line.

g) XYZ is a triangle in which m ($\angle$ y) = 100 ° , then its longest side is ………… .

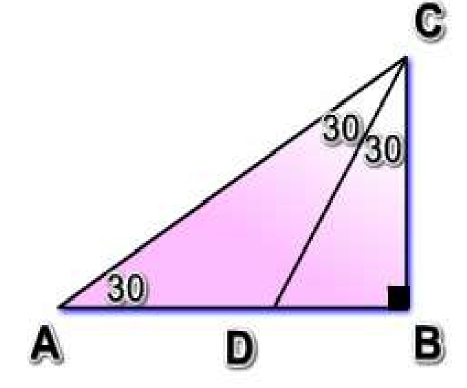
h) ABC is a triangle in which m ($\angle$ A) = 40 °, m ($\angle$ B) = 55 °, then its shortest side is ………… .

3) In the opposite figure:

ABC is a right-angled triangle ,

If m(∠ A) = m(∠ ACD) = m (∠ BCD) = 30 °

Then, Prove that: AC > DC



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………

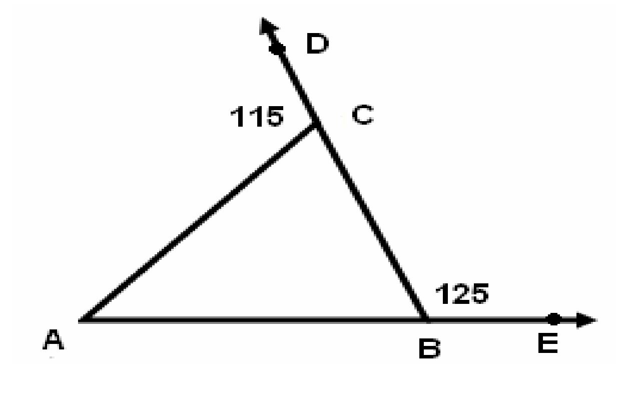
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4) In the opposite figure:

ABC is a triangle, m(∠ ACD) = 115 °,

m(∠EBD) = 125 °

Prove that: AB > AC



………

………

………

………

………

5) In the opposite figure:

ABCD is a quadrilateral, BC = DC

and m(∠ D) > m(∠B)

Prove that: AB > AD

....

....

....

....

6) In the opposite figure:

If AB > AC and $\overline{DE}$ // $\overline{BC}$, then

Prove that: AE > AD

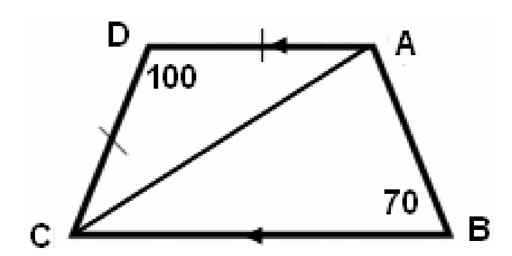
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7) In the opposite figure:



If $AD = DC$, $\overline{AD} // \overline{BC}$,

$m(\angle D) = 100°$ and $m(\angle B) = 70°$

, then

Prove that: $AC > AB$

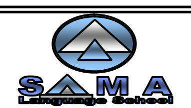
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Date:............ **Sheet (8)** 

Triangles' inequality

1) Complete the following :

a) For any triangle, the sum of the lengths of any two sides is .... than the length of the third side.

b) If the lengths of two sides of an isosceles triangle are 3 cm and 7 cm , then the length of the third side = ...

c) If the lengths of two sides of an isosceles triangle are 4 cm and 8 cm , then its perimeter = ...

d) If ABC is a triangle, then AB + BC – AC .... zero

e) In a triangle, if two sides have unequal lengths, then the longer side is opposite to the angle of the .... measure.

f) The number of axes of symmetry of the rectangle = ...

g) The number of axes of symmetry of the parallelogram = ...

h) The axis of symmetry of the isosceles triangle is the straight line drawn from the .... angle perpendicular to its ....

i) Any point at the axis of symmetry of any line segment is at .... distances from its end points.

j) The median of an isosceles triangle from the vertex angle .... it and is .... to the base.

k) If the measure of one angle in the right-angle triangle =45 °, then the triangle is ....

l) If two angles of a triangle are congruent, then the two sides opposite to these two angles are .... and the triangle is ....

2) Which of the following groups are valid in drawing a triangle?

a) 3cm, 4cm, 8cm -------------------------

b) 4cm, 5cm, 3cm -------------------------

c) 13cm, 6cm, 6cm -------------------------

d) 24cm, 7cm, 30cm. -------------------------

3) Choose the correct answer form those given:

1) The sum of lengths of any two sides in a triangle is ....the length of the third side.

a) less than b) greater than c) equal d) half

2) The lengths of any side in a triangle........the sum of lengths of the two other sides.

a) > b) < c) = d) twice

3) Which of the following numbers cannot be the lengths of sides of a triangle...........

a) 7 , 7 , 5 b) 9 , 9 , 9 c) 3 , 6 , 12 d) 3 , 4 , 5

4) If the lengths of two sides in a triangle are 7 cm. and 4 cm., then the length of the third side can be ....

a) 1 cm b) 2cm c) 3cm d) 4cm

5) If the lengths of two sides of an isosceles triangle are 3cm. and 7 cm., then the length of the third side = ...

a) 7cm b) 3cm c) 4cm d) 10cm

6) A triangle has one axis of symmetry, the lengths of two sides in it are 4cm. and 8cm., then its perimeter = ...

a) 16 cm b) 20cm c) 24 cm d) 30 cm

7) In ΔABC: if AB = 3cm., BC = 5cm. and AC = X cm., then X $\in$ ....

a)] 3, 5 [b)] 2 , 5 [c)] 5 ,8 [d)] 2 , 8 [

8) If the lengths of two sides of a triangle are 5cm. and 10 cm., ten the length of the third side belongs to ....

a) [10 , 15 [b)] 5 , 15 [c)] 5 , 10] d) [10 , 15]

9) In Δ ABC : AB + BC – AC ....

a) > zero b) < zero c) = zero d) = the perimeter of the triangle

4) In the opposite figure:

XYZ is a triangle in which YZ is the longest side, L $\in$ YZ such that ZL = ZX

Prove that: XY > XL

Y L Z X

....

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....

5) In the opposite figure:

ABCD is a quadrilateral.

Prove that: (AB + BC + CD) > AD

D A B C

....

....

....

Model Exams

Model (1)

Answer the following questions :

1 Choose the correct answer from the given ones :

1. The length of the median drawn from the vertex of the right angle in the right - angled triangle = ... the length of the hypotenuse of the triangle.
   (a) 2 (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$
2. The number of axes of symmetry of the equilateral triangle is ....
   (a) 3 (b) 1 (c) 2 (d) 4
3. In Δ ABC , if BC > AB , then m ($\angle$ A) .... m ($\angle$ C)
   (a) = (b) < (c) ≤ (d) >
4. The medians of the triangle intersect at ....
   (a) one point (b) two points (c) 3 points (d) 4 points
5. The sum of lengths of any two sides in any triangle .... the length of the third side.
   (a) is less than (b) is greater than (c) equals (d) otherwise
6. If the measure of an angle of the isosceles triangle is 100° , then the measure of one of the other angles = ...
   (a) 50° (b) 100° (c) 40° (d) 80°

---

2 Complete the following :

1. The axis of symmetry of the line segment is ....
2. The two base angles of the isosceles triangle are ....
3. The measure of the exterior angle of the equilateral triangle is ....°
4. If the lengths of two sides in the triangle are not equal , then the greater side in length is opposite to ....
5. The sum of measures of any two consecutive angles in the parallelogram = ...
6. The median of an isosceles triangle drawn from the vertex bisects .... and is perpendicular to ....

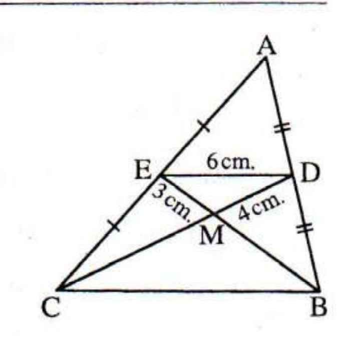
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3 [a] In the opposite figure :

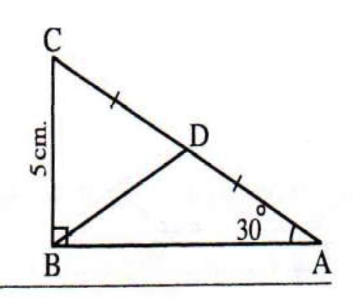
$\overline{BE}$ and $\overline{CD}$ are two medians

in Δ ABC , ME = 3 cm. , MD = 4 cm. and

DE = 6 cm. Find the perimeter of Δ MBC



[b] In the opposite figure :



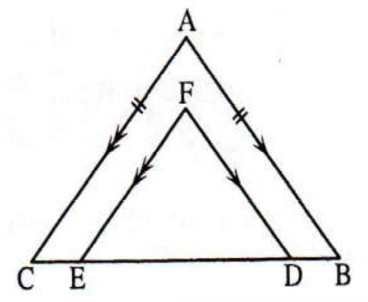
ABC is a right-angled triangle at B ,

D is the midpoint of $\overline{AC}$, m (∠ A) = 30° , BC = 5 cm.

Find the length of $\overline{BD}$

---

4 **[a] In the opposite figure :**



D $\in \overline{BC}$, E $\in \overline{BC}$, $\overline{AB}$ // $\overline{FD}$ and

$\overline{AC}$ // $\overline{FE}$ if AB = AC

Prove that : FDE is an isosceles triangle

Model (2)

Answer the following questions :

1 Choose the correct answer from the given ones :

1. ABC is a triangle in which : m (∠ B) = 70° , m (∠ C) = 50° , then BC .... AB
   (a) > (b) < (c) = (d) ≡

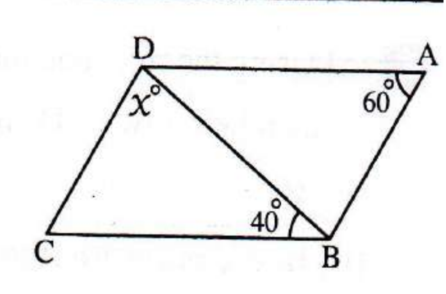
2. The isosceles triangle has .... axis of symmetry.
   (a) 1 (b) 2 (c) 3 (d) otherwise

3. The sum of lengths of any two sides in the triangle .... the length of the third side.
   (a) > (b) < (c) ≥ (d) ≤

4. The length of the side opposite the angle of measure 30° in the right-angled triangle .... the length of the hypotenuse.
   (a) twice (b) half (c) square (d) equals

5. ABC is a triangle in which AB = AC , D is the midpoint of $\overline{BC}$, then $\overline{AD}$ is ....
   (a) a median (b) altitude
   (c) bisector of the vertex angle (d) all the previous.

6. **In the opposite figure :**
   If ABCD is a parallelogram ,
   then x = ...
   (a) 60° (b) 40°
   (c) 80° (d) 20°



2 Complete the following :

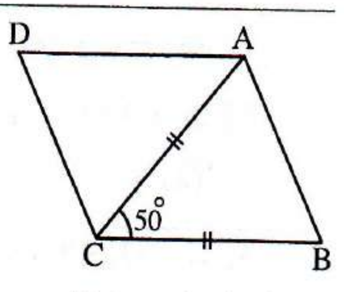
1. The longest side in the right-angled triangle is ....
2. ABC is a triangle in which AB = AC , m (∠ A) = 50° , then m (∠ B) = ...
3. ABC is a triangle in which AB > BC > AC , then the smallest angle in measure of it is ....
4. The point of intersection of the medians of any triangle divides each of them with the ratio .... from the base.
5. If the point A ∈ the axis of symmetry of $\overline{BC}$, then AB = ...
6. ABC is a triangle in which AB = 4 cm. , BC = 5 cm. then AC ∈] .... , ... [

3 **[a] In the opposite figure :**

ABCD is a parallelogram , CA = CB and

m (∠ ACB) = 50°

Find : m (∠ D)



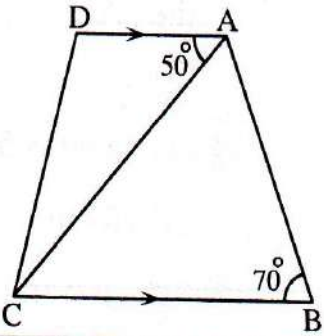
[b] In the opposite figure :

$\overline{AD}$ // $\overline{BC}$

, m (∠ DAC) = 50° and

m (∠ ABC) = 70°

Prove that : AC > AB

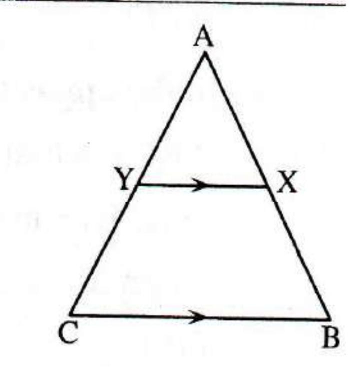


4 **[a] In the opposite figure :**

ABC is a triangle in which AB = AC

$\overline{XY}$ // $\overline{BC}$

Prove that : AXY is an isosceles triangle.



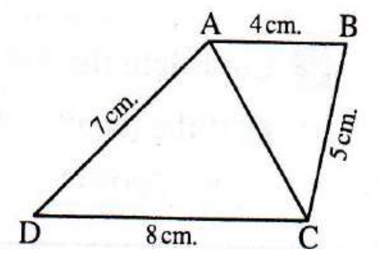
[b] In the opposite figure :

ABCD is a quadrilateral in

which AB = 4 cm. , BC = 5 cm. ,

CD = 8 cm. and AD = 7 cm.

Prove that : m (∠ BAD) > m (∠ BCD)



Model (3)

Answer the following questions :

1 Choose the correct answer from the given ones :

1. The number of axes of symmetry in the isosceles triangle = ...

(a) 1 (b) 2 (c) 3 (d) not exist

2. In Δ ABC , if m ($\angle$ A) = 65° and m ($\angle$ B) = 50° , then AB .... BC

(a) > (b) < (c) ≡ (d) =

3. If $\overline{AD}$ is a median in Δ ABC , M is the point of intersection of the medians of it , then AD .... AM

(a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) $\frac{3}{2}$

4. The lengths 5 cm. , 4 cm. and .... can be lengths of the sides of a triangle.

(a) 15 cm. (b) 9 cm. (c) 8 cm. (d) 11 cm.

5. ABC is a triangle in which AB > AC , m ($\angle$ C) = 70° , then m ($\angle$ B) may be ....

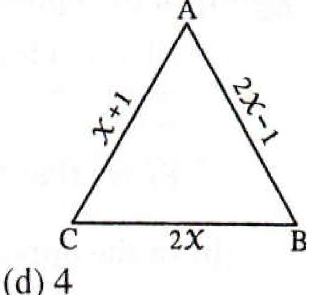
(a) 70° (b) 50° (c) 80° (d) 75°

6. **In the opposite figure :**

ABC is a triangle in which

m ($\angle$ B) = m ($\angle$ C)

, then X = ...



(a) 1 (b) 2 (c) 3 (d) 4

---

2 Complete the following :

1. If the lengths of two sides in a triangle are not equal , then the greater side in length is opposite ....

2. The two base angles of the isosceles triangle are ....

3. If ABC is right-angled at B and AB = $\frac{1}{2}$ AC , then m ($\angle$ A) = ...°

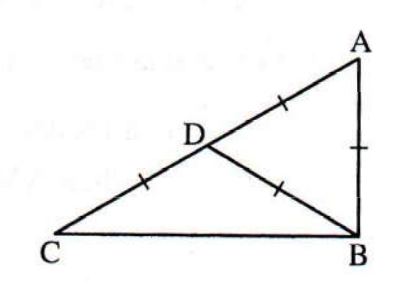
4. If the lengths of two sides in the isosceles triangle are 5 cm. and 10 cm. , then the length of the third side = ... cm.

5. Each two opposite angles in the parallelogram are ....

6. **In the opposite figure :**

AB = BD = AD = DC

m ($\angle$ C) = ...°

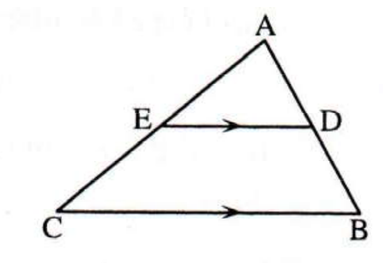


3 **[a]** Using the ruler and the compasses , draw

ΔABC in which $AB = AC = 5$ cm. and $BC = 6$ cm. ,

then bisect $\overline{BC}$ at D and find the length of $\overline{AD}$ by measuring.

[b] In the opposite figure :



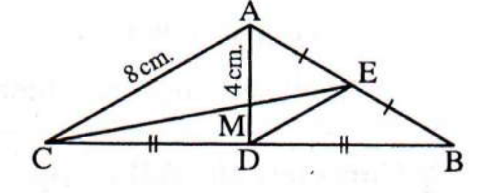
ABC is a triangle in which $AC > AB$,

$\overline{DE} \parallel \overline{BC}$

Prove that : $AE > AD$

---

4 **[a] In the opposite figure :**

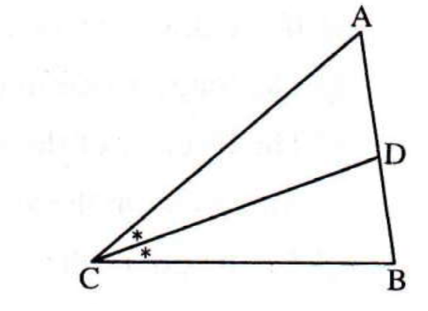


ABC is a triangle in which $\overline{AD}$ is a median ,

$\overline{CE}$ is a median , $AC = 8$ cm. , $EC = 9$ cm. and

$AM = 4$ cm. Calculate the perimeter of ΔEDM

[b] In the opposite figure :



ABC is a triangle in which

$\overrightarrow{CD}$ bisects $\angle ACB$

Prove that : $BC > BD$

Model (4)

Answer the following questions :

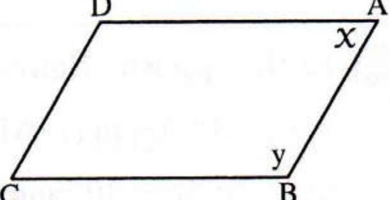
1 Choose the correct answer from the given ones :

1. The triangle which has no axes of symmetry is .... triangle.
   (a) a scalene (b) an isosceles (c) an equilateral
2. If $\overline{AD}$ is a median of ΔABC , M is the point of intersection of the medians of ΔABC , then AM = ... AD
   (a) $\frac{1}{2}$ (b) 2 (c) $\frac{1}{3}$ (d) $\frac{2}{3}$
3. In the isosceles triangle if the measure of one of the two base angles = 50° , then the measure of the vertex angle = ...
   (a) 50° (b) 100° (c) 80° (d) 130°
4. The axis of symmetry of a line segment is the straight line which is ....
   (a) perpendicular to it (b) its bisector
   (c) the perpendicular bisector (d) parallel to it
5. In ΔABC , if m ($\angle$ B) = 70° and m ($\angle$ C) = 50° , then AB .... AC
   (a) > (b) < (c) = (d) ≥
6. In the parallelogram , the two diagonals are ....
   (a) equal in length (b) perpendicular
   (c) bisecting each other (d) parallel

---

2 Complete the following :

1. If X cm. , 4 cm. and 5 cm. are lengths of the sides of a triangle , then .... $< X <$ ....
2. The longest side in the right-angled triangle is ....
3. The bisector of the vertex angle of the isosceles triangle is ....
4. Any point on the axis of symmetry of a line segment is ....
5. The length of the side opposite the angle whose measure = 30° in the right - angled triangle equals ....
6. **In the opposite figure :**
   ABCD is a parallelogram ,
   then X + y = ... °



---

3 [a] Prove that : the length of the median of the right-angled triangle drawn from the vertex of the right angle equals half the length of the hypotenuse of this triangle.

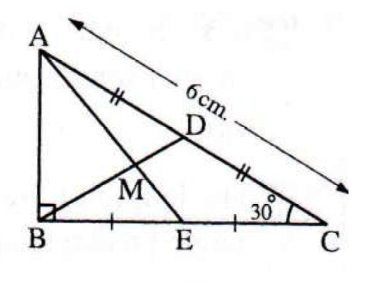
[b] In the opposite figure :

ABC is a right-angled triangle at B

D is the midpoint of $\overline{AC}$, E is the midpoint of $\overline{BC}$,

m (∠ C) = 30° , $\overline{BD} \cap \overline{AE} = \{M\}$ and

AC = 6 cm.



Find : 1 The length of $\overline{BM}$ 2 The perimeter of Δ ABD

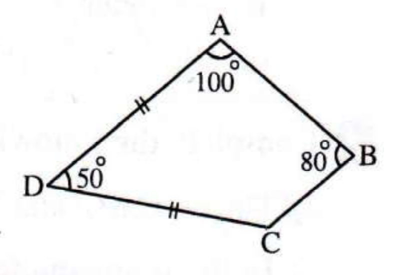
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4 **[a]** Draw Δ ABC which is right-angled at B such that BC = 4 cm. , AB = 3 cm. , then bisect $\overline{AC}$ at the point D , using the ruler and the compasses only and find the length of $\overline{BD}$ (Don't remove the arcs)

[b] In the opposite figure :

AD = DC , m (∠ A) = 100° , m (∠ B) = 80° ,

m (∠ D) = 50°



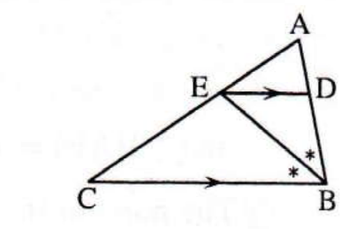
Prove that : AB > BC

---

5 **[a] In the opposite figure :**

$\overrightarrow{BE}$ bisects ∠ ABC and $\overline{ED}$ // $\overline{BC}$

Prove that : Δ DBE is an isosceles triangle.

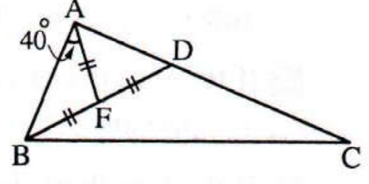




[b] In the opposite figure :

F is the midpoint of $\overline{DB}$, AF = FD = FB

m (∠ BAF) = 40°



Prove that : 1 AD < AB 2 BC > AC

Model (5)

Answer the following questions :

1 Choose the correct answer from the given ones :

1. If Δ ABC has one axes of symmetry and m ($\angle$ ABC) = 120° , then m ($\angle$ A) = ...

   (a) 30° (b) 60° (c) 120° (d) 50°

2. In Δ ABC if m ($\angle$ A) = 30° and m ($\angle$ B) = 90° , then AC = ...

   (a) $\frac{1}{2}$ BC (b) 2 BC (c) 2 AB (d) BC

3. If ABC is right-angled at B , then AB .... AC

   (a) > (b) = (c) < (d) ≤

4. If 3 cm. and 7 cm. are two lengths of two sides in a triangle , then the greatest integer representing the length of the third side is .... cm.

   (a) 3 (b) 7 (c) 9 (d) 10

5. The length of the median drawn from the vertex of the right angle of the right-angled triangle equals ....

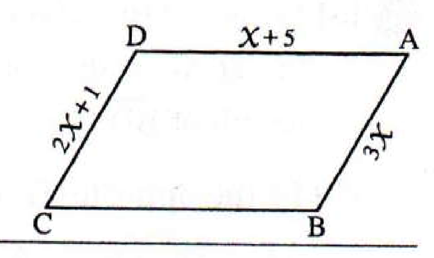
   (a) half the length of the hypotenuse. (b) twice the length of the hypotenuse.
   (c) $\frac{1}{4}$ the length of the hypotenuse. (d) the length of the hypotenuse.

6. **In the opposite figure :**

   ABCD is a parallelogram.

   Its perimeter = ... cm.

   (a) 18 (b) 12 (c) 9 (d) 6



2 Complete the following :

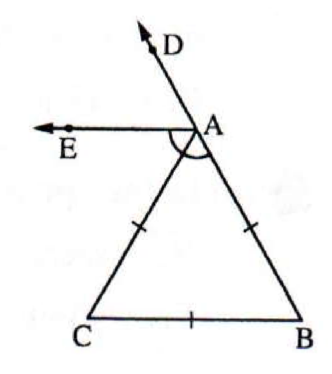
1. The perpendicular bisector of a line segment is called ....

2. **In the following figure :**

   D $\in \overrightarrow{BA}$, AB = BC = CA and

   $\overrightarrow{AE}$ bisects $\angle$ CAD , then

   m ($\angle$ BAE) = ...°



3. The point of intersection of the medians of the triangle bisects each of them with the ratio .... : .... from the base.

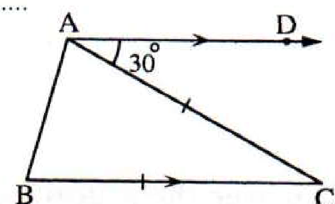
4. If the lengths of two sides of a triangle are not equal , then the greater side in length is opposite ....

5. If the length of the median of a triangle drawn from a vertex is equal to the half length of the opposite side , then the angle of this vertex is ....

6. **In the opposite figure :**

$CA = CB$, $\overrightarrow{AD} \parallel \overline{BC}$ and $m(\angle DAC) = 30°$,

then $m(\angle CAB) = ...°$



3 **[a] In the opposite figure :**

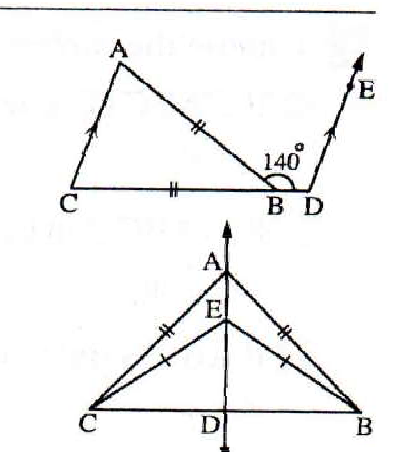
$\overrightarrow{DE} \parallel \overline{AC}$, $AB = BC$ and

$m(\angle ABD) = 140°$ Find $m(\angle EDB)$

[b] In the opposite figure :

$AB = AC$, $EB = EC$

Prove that : $\overleftrightarrow{AE}$ is the axis of symmetry of $\overline{BC}$



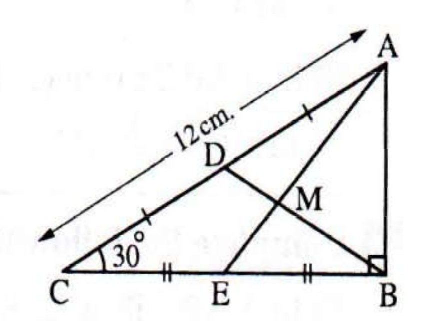
4 [a] Draw the line segment $\overline{AB}$ whose length is 7 cm. then divide it in to 4 equal parts in length using the compasses and the unscaled ruler.

[b] In the opposite figure :

ΔABC is right-angled at B ,

$m(\angle C) = 30°$, D and E are the midpoints of $\overline{AC}$ and $\overline{BC}$ respectively $AC = 12$ cm.

Find the length of each of $\overline{AB}$ and $\overline{BM}$

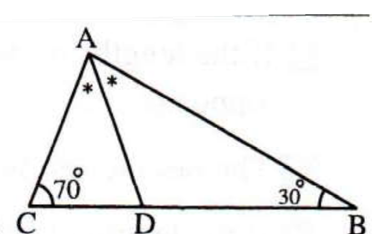


5 **[a] In the opposite figure :**

$\overrightarrow{AD}$ bisects $\angle BAC$, $m(\angle B) = 30°$ and

$m(\angle C) = 70°$

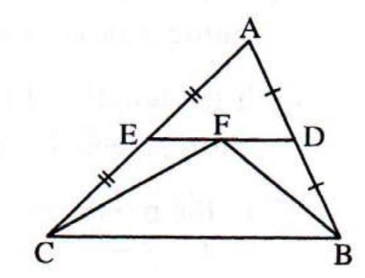
Prove that : 1. $BC > AB$ 2. ΔADC is isosceles triangle



[b] In the opposite figure :

D and E are the midpoints of $\overline{AB}$ and $\overline{AC}$

Prove that : $FB + FC > 2\,DE$



Answer the following questions : **Model (6)**

1 Choose the correct answer from the given ones :

1. If the lengths of two sides of an isosceles triangle are 11 cm. and 5 cm. , then the length of the third side is ....
   (a) 11 cm. (b) 5 cm. (c) 4 cm. (d) 6 cm.

2. The number of axes of symmetry of the triangle in which the measure of two angles are 60° and 70° equals ....
   (a) 1 (b) 2 (c) zero (d) 3

3. The length of the hypotenuse of the right-angled triangle = ... the length of the median drawn from the vertex of the right angle.
   (a) half (b) twice (c) third (d) quarter

4. ABC is a triangle in which $m(\angle A) = 54°$, $m(\angle B) = 72°$, then ....
   (a) $AB < BC$ (b) $AB = BC$
   (c) $AB > BC$ (d) $\overline{AB} \perp \overline{BC}$

5. The point of intersection of the medians of the triangle bisects each of them with ratio .... from the vertex.
   (a) 1 : 3 (b) 3 : 1 (c) 1 : 2 (d) 2 : 1

6. In ΔABC : if $m(\angle B) = 90°$ and $m(\angle A) = 60°$, then ....
   (a) $BC = \frac{1}{2} AC$ (b) $AC = \frac{1}{2} AB$ (c) $AC = 2 AB$ (d) $AC = 2 BC$

2 Complete the following :

1. In ΔABC if $m(\angle B) - m(\angle A) > m(\angle C)$, then AC .... AB
2. If the lengths of two sides of a triangle are not equal , then the greater in length is opposite ....
3. The bisector of the vertex angle of the isosceles triangle ....
4. If the length of any side of a triangle = $\frac{1}{3}$ the perimeter of the triangle , then the number of axes of symmetry of the triangle is ....
5. If the lengths of two sides of a triangle are 5 cm. and 7 cm. , then the length of the third side $\in$] .... , ... [
6. In the parallelogram , the two diagonals ....

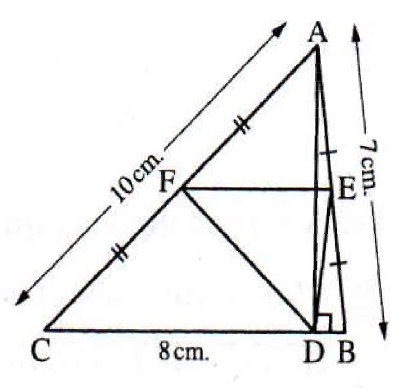
3 **[a] In the opposite figure :**

Δ ABC in which AB = 7 cm. , BC = 8 cm. ,

CA = 10 cm. , E bisects $\overline{AB}$,

F bisects $\overline{AC}$, $\overrightarrow{AD} \perp \overline{BC}$

Find the perimeter of Δ DEF



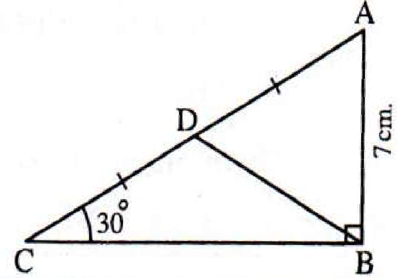
[b] In the opposite figure :

Δ ABC is right-angled at B

D bisects $\overline{AC}$, m ($\angle$ C) = 30° and

AB = 7 cm. Find the length

of each of $\overline{AC}$ and $\overline{BD}$



4 **[a]** Draw Δ ABC in which AB = AC = 5 cm.

BC = 4 cm. , then using the unscaled ruler and the compasses , bisect $\overline{AC}$ at D ,

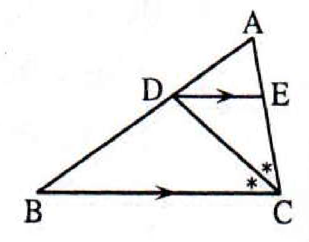
then draw $\overrightarrow{DE}$ // $\overline{BC}$ and cuts $\overline{AB}$ at E

Is DE = $\frac{1}{2}$ BC ?

[b] In the opposite figure :

$\overrightarrow{CD}$ bisects $\angle$ ACB , $\overline{DE}$ // $\overline{CB}$

Prove that : Δ ECD is an isosceles triangle.



5 **[a] In the opposite figure :**

ABC is a triangle in which AB = AC

D $\in \overline{BC}$

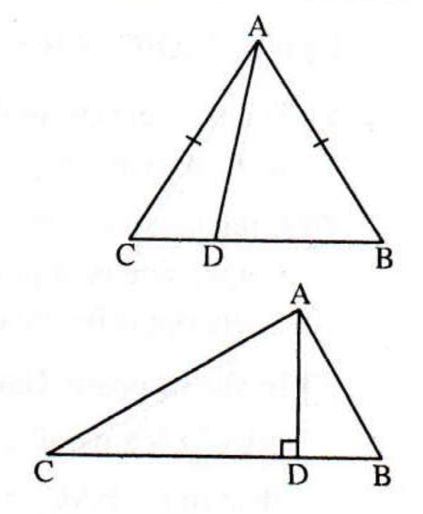
Prove that : AB > AD

[b] In the opposite figure :

ABC is a triangle in which AC > AB

$\overline{AD} \perp \overline{BC}$

Prove that : m ($\angle$ BAD) < m ($\angle$ CAD)



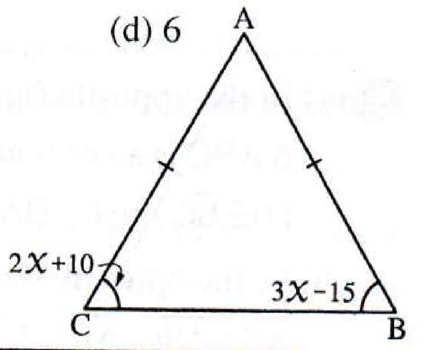


Answer the following questions :

Model (7)

1 Choose the correct answer from the the given ones :

1. ABC is a triangle in which m ($\angle$ A) = 30° , m ($\angle$ B) = 90° then AC = ...
   (a) 2 BC (b) $\frac{1}{2}$ BC (c) 2 AB (d) $\frac{1}{2}$ AB
2. If Δ ABC has one axis of symmetry and m ($\angle$ B) = 120° , then m ($\angle$ A) = ...
   (a) 60° (b) 120° (c) 30° (d) 40°
3. If in Δ ABC : m ($\angle$ A) = 50° and m ($\angle$ B) = 60° , then AB .... AC
   (a) > (b) < (c) ≤ (d) =
4. The point of intersection of the medians of the triangle divides each of them with ratio .... from the vertex.
   (a) 1 : 3 (b) 3 : 1 (c) 1 : 2 (d) 2 : 1
5. If the lengths of two sides of a triangle are 3 cm. and 7 cm. , then the smallest integer which represents the length of the third side = ... cm.
   (a) 3 (b) 4 (c) 5 (d) 6



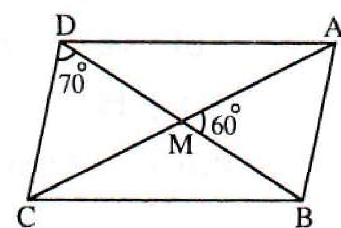
6. **In the opposite figure :**
   ABC is a triangle in which AB = AC
   , then m ($\angle$ A) = ...
   (a) 40° (b) 50° (c) 60° (d) 70°

2 Complete the following :

1. In Δ ABC , AB + BC − AC > ....
2. The bisector of the vertex angle of the isosceles triangle ....
3. If in Δ ABC : AB = AC and m ($\angle$ A) = 2 m ($\angle$ B) , then m ($\angle$ C) = ...
4. The isosceles triangle in which the measure of one of its angles is 60° , has .... axes of symmetry.
5. If the lengths of two sides of a triangle are not equal , then the longer side is opposite an angle .... than the measure of the angle opposite the other.



6. **In the opposite figure :**
   ABCD is a parallelogram ,
   then m ($\angle$ BAC) = ...

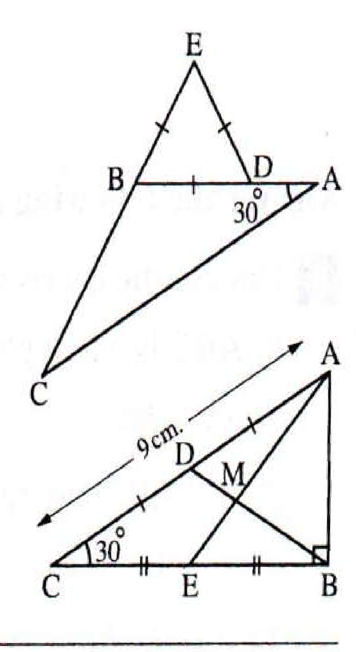


3 **[a] In the opposite figure :**

$E \in \overrightarrow{CB}$, $D \in \overline{AB}$

$ED = DB = EB$ and $m(\angle A) = 30°$

Prove that : ABC is an isosceles triangle.



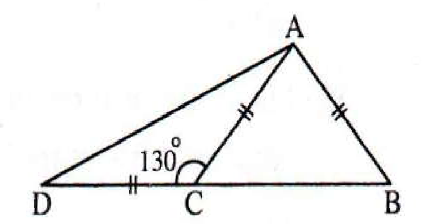
[b] In the opposite figure :

ΔABC is right-angled at B

$m(\angle C) = 30°$, D bisects $\overline{AC}$

, E bisects $\overline{BC}$ and $AC = 9$ cm.

Find by proof the length of each of $\overline{BD}$, $\overline{BM}$ and $\overline{AB}$



4 **[a] In the opposite figure :**

$CD = CA = AB$, $C \in \overline{BD}$

and $m(\angle ACD) = 130°$

Find by proof $m(\angle BAD)$

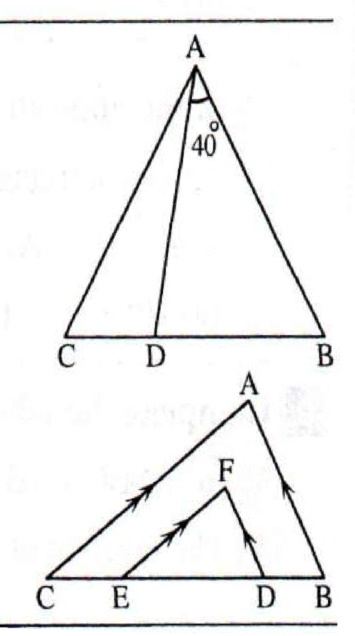
[b] Using the ruler and the compasses , draw ΔABC which is equilateral and its side length = 6 cm. , then draw $\overrightarrow{BD} \perp \overline{BC}$ and find $m(\angle DBA)$

(Don't remove the arcs)

5 **[a] In the opposite figure :**

ΔABC is an equilateral triangle

$D \in \overline{BC}$, $m(\angle DAB) = 40°$, prove that $AB > AD$



[b] In the opposite figure :

$\overline{AB} \parallel \overline{DF}$, $\overline{AC} \parallel \overline{EF}$,

$AC > AB$

Prove that : $FE > DF$

Model (8)

1 Choose the correct answer from the given ones :

1. An isosceles triangle , one of its base angles has measure 70° , then the measure of the vertex angle = ...

(a) 70° (b) 110° (c) 20° (d) 40°

2. If in Δ XYZ : XY > XZ then m ($\angle$ Y) .... m ($\angle$ Z)

(a) > (b) < (c) ≥ (d) =

3. Δ ABC is right-angled at B , then AB .... AC

(a) ≡ (b) ⊥ (c) < (d) >

4. If A lies on the axis of symmetry of $\overline{XY}$, then $\overline{AX}$ .... $\overline{AY}$

(a) ⊥ (b) ≡ (c) // (d) =

5. An isosceles triangle , the lengths of two sides of it are 4 cm. and 9 cm. , then the length of the third side = ... cm.

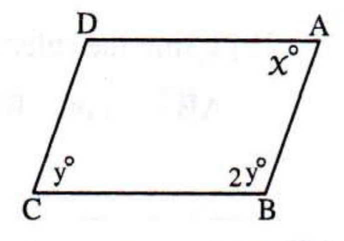
(a) 4 (b) 5 (c) 9 (d) 13

6. **In the opposite figure :**

ABCD is a parallelogram , then x = ...

(a) 70° (b) 120°

(c) 60° (d) 50°



2 Complete the following :

1. The longest side in the right-angled triangle is ....

2. In Δ XYZ : m ($\angle$ Y) = 110° , then the longest side is ....

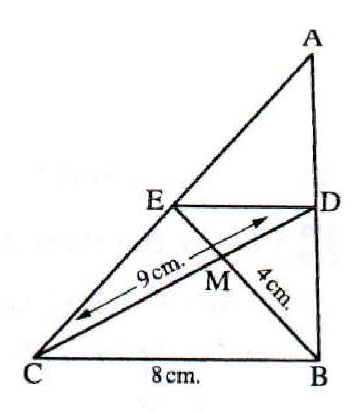
3. The point of intersection of the medians of the triangle divides each of them with the ratio 1 : 2 from ....

4. In Δ ABC : m ($\angle$ A) = 55° , m ($\angle$ B) = 70° then the number of axes of symmetry of the triangle is ....

5. The median which is drawn from the vertex of an isosceles triangle bisects .... and it is .... to the base.

6. Δ ABC is right-angled at B , AB = 3 cm. , BC = 4 cm. If $\overline{BD}$ is a median of Δ ABC , then BD = ... cm.

3 **[a] In the opposite figure :**



In ΔABC : $\overline{CD}$ and $\overline{BE}$ are two medians intersecting at M

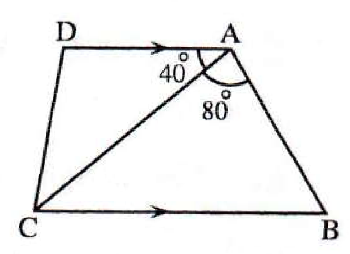
DC = 9 cm. ,

BM = 4 cm. , BC = 8 cm.

Find the perimeter of Δ MDE



[b] In the opposite figure :



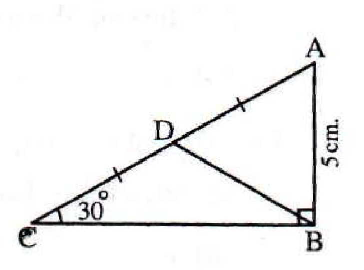
$\overline{AD} \parallel \overline{BC}$, m ($\angle$ BAC) = 80° and

m ($\angle$ DAC) = 40°

Prove that : BC > AC

---

4 **[a] In the opposite figure :**



Δ ABC is right-angled at B

m ($\angle$ C) = 30° , AB = 5 cm. and

D bisects $\overline{AC}$ Find by proof

the length of each of $\overline{AC}$ and $\overline{BD}$

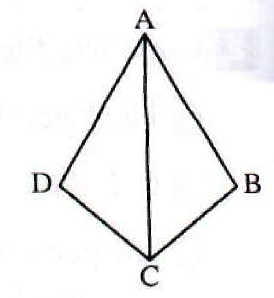
[b] Using the ruler and the compasses , only draw Δ ABC which is right-angled at B

AB = 3 cm. , BC = 4 cm. bisect $\overline{AC}$ at D Then find the length of $\overline{BD}$

(Don't erase the arcs)

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5 **[a] In the opposite figure :**

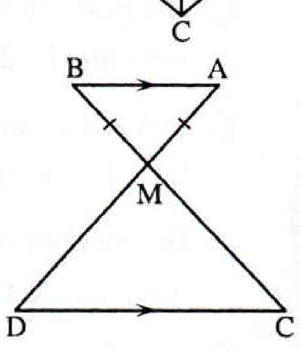


AB > BC and

AD > DC

Prove that : m ($\angle$ BCD) > m ($\angle$ BAD)

[b] In the opposite figure :



$\overline{AB} \parallel \overline{CD}$,

, $\overline{AD} \cap \overline{BC} = \{M\}$

and MA = MB

Prove that : MCD is an isosceles triangle.